

BOOK REVIEWS

M.J. Priest (2006) *Septoria*, Fungi of Australia. ABRIS Canberra and CSIRO Collingwood. (pp. vi + 259) B5, Hardback. ISBN 0 643 05702 1

Septoria is one of the species rich anamorph genera of *Mycosphaerella*. This volume includes descriptions of 132 taxa from 54 families of host plants. It is therefore a surprise to find only five named species of *Mycosphaerella* and two unnamed species in this book. *Septoria* itself is speciose with descriptions of 106 named species and 10 species not positively identified. Descriptions are also given of one species in each of the genera *Ascochyta*, *Clypeopycnis*, *Cystogonospora*, *Phloeospora*, *Selenophoma*, *Septocyta* and three species in *Staganospora*. Fourteen taxa have been excluded and 50 published names are considered doubtful. Sixteen new species are described. This is something of a surprise as more novelties might have been expected. The richest family in terms of number of species is Asteraceae with 24, followed by Poaceae with 15. In recent years, many species of *Mycosphaerella* have been described from eucalypts both in Australia and overseas. In Australia there is no species of *Septoria* on a species of Myrtaceae, though there is one in New Zealand, *Septoria typica*.

As well as the taxonomic descriptions, the book includes a history of the nomenclature of *Septoria* and of previous research in Australia, the taxonomic characters used to delimit taxa, a discussion of similar genera and of teleomorphs of *Septoria*. A key to taxa of *Septoria* is given if there are three or more taxa on a particular host plant family. However, taxa in other genera described in the book, are not included in the keys.

The book is illustrated with 136 splendid figures of line drawings of vertical section of conidiomata and ascomata, conidiogenous cells, asci, conidia and ascospores. The drawings are clear and of a high standard. The book concludes with a glossary, extensive bibliography and index.

This is a classical monographic treatment of an important genus of plant pathogens. During the course of this study over 1100 collections were examined. Michael Priest has made a notable and enduring contribution to mycology with this volume. The text is clear, concise and very readable. Publication of this volume should encourage others to continue the quest to document and understand the less conspicuous Australian mycota.

Jack Simpson

Ann Bell (2005). *An Illustrated guide to the coprophilous Ascomycetes of Australia*.

CBS Biodiversity Series No. 3. Centraalbureau voor Schimmelcultures, Utrecht, The Netherlands. (pp. x + 172) A4, soft cover, spiral bound. ISBN 90-70351-580

This book is the most marvellous outcome of years of generous international cooperation. A New Zealand mycologist with a love of fimicolous fungi extending her previous studies in New Zealand (Bell 1983) to Australia, incorporating the studies of Major Harry Dade, a retired English expatriate working in Australia between 1964 and 1978, the Herbarium DAR where the notebooks and some 2000 microscope slides prepared by Dade were kept, diverse volunteer collectors of dung in Australia (about 300 collections), a helpful husband and CBS for publishing this beautiful book.

The book is exquisitely illustrated starting with a full page colour 'Dungscape' painted by Dade, two pages of colour photographs of ascocarps, asci and ascospores of coprophilous ascomycetes, and 115 mostly full page figures of line drawings and watercolour paintings of ascocarps, asci and ascospores of dung inhabiting ascomycetes. The quality of the illustrations, by Dade and Bell, is outstanding. Illustrations of microcharacters of similar taxa are mostly grouped together to facilitate recognition and comparison.

The text, 69 pages, includes a biography of Harry Dade, a guide to the identification of coprophilous ascomycetes, and extended keys to the genera and species identified during the study. As an introduction to the keys to taxa in a genus there is an insightful discussion of the genus with information on its ecology. In a trial with some macropod dung I found the keys to be very effective and clear. The descriptions are intended to help the reader to make an accurate identification. The book does not provide comprehensive species descriptions. For people who want to put a name on a fungus collected on dung this book is excellent. If one wants full descriptions of most species of coprophilous fungi the excellent book by Doveri (2005), written in both Italian and English, can be recommended. There are six pages of references.

One hundred and seventy six species of ascomycete were identified during the study from 936 records of species. Thirteen new species were found and 10 are formally described in this volume. The other three have been described elsewhere. The proportion of new species (7.6%) may come as a surprise.

This is a book to treasure. The Centraalbureau voor Schimmelcultures is to be commended for the quality of this guide to Australian dung fungi. For those interested in ecology and beauty on a small scale, dung fungi have a lot to offer. This most learned and attractive book should encourage many to make the acquaintance of these fascinating fungi.

References

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Jack Simpson

G. Council, D. Antonini & M. Antonini *I Genere Cortinari in Italia*. Tome I (2003); Tome II (2004); Tome III (2005); Tome IV (2006). 240 x 170 mm. Associazione Micologica Bresadola Fondazione Centro Studi Micologici dell'A.M.M. €55.00 + €16.00 per volume postage

Each volume in this on-going series comprises a very sturdy four ring binder containing 50 individual cards, on coated 200 g paper, each of four pages, and a long introductory essay. Each card contains a description of one taxon, usually a species sometimes a variety or subspecies. For each taxon there are comprehensive nomenclature, etymology, the original description, descriptions of macro- and micro-characters, habitat, a map showing the distribution in Italy, a black and white SEM photograph of basidiospores, line drawings of basidiospores, and two photographs, 140 x 93 mm in full colour of two collections of the taxon from different locations or at one location but taken on different occasions and a list of collections studied. In general, the colour and SEM photos are of a high standard. Each volume includes a substantial bibliography. The notes on each taxon also state its position in the classifications used in the multi volume series by Bidaud *et al.* (*Atlas des Cortinaires*) and Brandrud *et al.* (*Cortinarius Flora Photographica*).

Comparison of SEM photos and the line drawings of basidiospores show how difficult it is to accurately draw *Cortinarius* spore ornamentation. It would have been useful to have had drawings of other microcharacters including cystidia if present.

The big advantage of the looseleaf 'card' format is that taxa can be arranged in whatever order is considered desirable. Grouping taxa by subgenera and sections emphasizes how phenotypically variable species are. If spore ornamentation, as seen under SEM, is a good diagnostic character one wonders if some varieties would not be better classified as distinct species e.g. *Cortinarius varicolor* var. *nemorensis* and *C. adalberi* var. *turritus*.

The introductory essays are interesting. That of Tome II is a review of mycorrhizas and

structure of mycorrhizal populations by A. Vizzini (73 pp). In Tome III there are descriptions of the accepted subgenera (*Cortinarius*, *Dermocybe*, *Leproclybe*, *Myxadium*, *Phlegmacium*, *Rozites* and *Telamonia*), and a key to the subgenera based on morphological characters. There is also a report on statistical studies of spore dimensions. Tome I contains an essay on secondary metabolites in *Cortinarius* by A. Vizzini (35 pages).

The text is in Italian, as one would expect. However, such is the popularity of the series that English translations of the text of the taxon treatments are being prepared. These are available at a price of €15.00 + €7.00 for postage, for each volume.

This series can be strongly recommended to people wanting a modern account of *Cortinarius* as it occurs in the Mediterranean, a region with many similarities to large parts of Australia. It would be wonderful to have a series similar to this for *Cortinarius* in Australia. Wishful thinking perhaps as biological science publishers in Australia seem not to be an innovative lot.

Jack Simpson

Chapman A.D. (2006). *Numbers of Living Species in Australia and the World*. (pp. 60) 208 x 295 mm. Report for the Department of Environment and Heritage, Canberra, Australia. ISBN 9780 0 642 56849 6. This publication is available online at <http://www.deh.gov.au/biodiversity/abrs/publications/other/species-numbers/index.html>

With such an interesting title the anticipation of what this publication might contain was stimulus to the imagination. The report is attractively designed with lots of bare paper around the text and a broad header to most pages. Eight pages are devoted to vertebrates, 16 to invertebrates, four to plants, and 10 to 'Others'. The 'other groups are difficult to determine and characterize'. Furthermore it is 'often difficult to know what constitutes a species in many groups and to determine in what Kingdom the various Phyla should be placed.' This was hardly a confident start to

documenting the diversity of micro-organisms in Australia. The other 22 pages in the report include that essential feature, Executive Summary (5 pages), plus Introduction, Comparisons, Conclusions and Bibliography.

It is hard to let go of ideas that have served the scientific community well for decades. The basis for the definition of taxa of organisms has progressively shifted from the organizational to the cellular to the molecular level (Woese *et al.* 1990). The phylogeny of most phyla is now known though their relationships are not. The argument as to whether there are two empires of living organisms or three (Mayr 1998) has now been firmly decided in favour of the latter. There are three domains of organisms, two of bacteria the Archaea and the Bacteria, and one for eukaryotic organism the Eucarya (Woese *et al.* 1990). The Eucarya includes the Animalia, Fungi and Viridiplantae. Viruses may represent a fourth domain. The classification used in this report is decidedly old-fashioned.

The first page dealing with micro-organisms is devoted to lichens (not you will note lichenised fungi), with an estimated 5 000 species in Australia, 3 227 described, and 34% endemic. Fungi also get a page. There are an estimated 160 000–250 000 species in Australia, 5 672 described and an estimated 90% endemic. The category Fungi is then subdivided using a pre-Friesian classification 'Microfungi', 'Macrofungi (Basidiomycetes)' and 'Macrofungi (Ascomycetes)' but with no figures on numbers of described taxa in each group. Given the numerical accuracy of the total number this was somewhat surprising. The possibility there might be micro-basidiomycetes and micro-ascomycetes is not given consideration. Pucciniomycetes and yeasts do not warrant a mention. Nor do chytrids, although one is reported to be ravaging populations of Amphibia (one page) in Australia. At about the time this report was published, with its nonsensical size-based classification, James *et al.* (2006) published a six-gene phylogeny of the Fungi. The data published by James *et al.* (2006) clearly shows that the lichenised condition has evolved several times in numerous clades in both Ascomycota and Basidiomycota. There is no explanation as to why the report presents no data on number of taxa known or estimated from Australia in the following Classes of Fungi: Ascomycota,

Basidiomycota, Chytridiomycota,
Glomeromycota, Pucciniomycota,
Ustilaginomycota and Zygomycota.

The next group to be treated, another page, is 'Bacteria [Monera] [excluding Cyanobacteria].' According to Chapman, Australia has an estimated 40 000 species of bacteria of which 40 (sic) are described. Chapman acknowledges this 'appears to be a gross under-estimation'. The following page is devoted to Cyanophyta [Cyanobacteria] with an estimated 270 species in Australia. Clearly Chapman has never made the acquaintance of Garrity (2001–2003). Bacteria are the most abundant organisms in the biosphere although most are at present classified as viable-but-noncultivable organisms. Formal description is predicated on being able to culture the bacterium. Despite widespread horizontal gene transfer within communities of bacteria, technologies are available to produce robust prokaryotic phylogenies (Henz *et al.* 2005). It has already been mentioned that bacteria make up two of the three domains of living organisms. Domains do not get a mention in this report nor do the Archaea.

Algae [excluding Cyanobacteria] get two pages in a confused classification. Why Chromista does not get a page but Cyanobacteria and Amphibia for example do is not immediately apparent. There is no mention of Oomycetes in the treatment of the Chromista.

Viruses get one page, with an estimated 400 taxa described from Australia. Only two classes of viruses are considered, plant viruses and animal viruses. Chapman is apparently unaware of viruses, including phages, of micro-organisms. The modern virus classification of Fauquet *et al.* (2005) is ignored. There is no appreciation of the huge virus-associated diversity and the numerous previously unknown virus families (Culley *et al.* 2003) in oceans. Viroids are overlooked although they are not closely related to any viruses (Hadidi *et al.* 2003). The final three pages of this sorry saga are devoted to 'Protoctista [mainly Protozoa—others included under fungi, algae, etc.]'. The number of taxa described from Australia of any class of Protoctista is apparently not known.

The cellular biomass of Australia is, as is that of the Earth, predominantly microbial. In numbers and in amount of cellular carbon they contain the microbial population dwarfs that of multicellular organisms (Whitman *et al.* 1998). What was the purpose of including micro-organisms in this report if they are to be treated in such an off hand way. The information presented for micro-organisms cannot be used to estimate rates of extinction, proportions of redundant taxa or to identify key species (Bolger 2001). Was it to try to demonstrate that there is no background of knowledge of micro-organisms in Australia, that micro-organisms are taxonomically intractable, that species concepts are uncertain? If that was the case does it not raise the question what is the point of species counts? They are but one measure of diversity and give no indication of intra species population heterogeneity. If micro-organisms are so difficult to address in terms of species richness diversity the question that should be asked is what measures of diversity are appropriate? Genomic techniques are now available to analyse microbial community structure and function (Keller & Zengler 2004). We have past the stage in ecology of micro-organisms 'where the objects of interest and their interactions often cannot be perceived through direct observation' (Woese 1998).

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Jack Simpson

Grey, P. & Grey, E. (2005). *Fungi down under. The Fungimap Guide to Australian Fungi.* (pp. xiv + 146) 210 x 150 mm. Soft cover. Fungimap, South Yarra, Australia. \$29.95. ISBN 0 646 44674 6

Fungimap is an innovative project involving more than 300 volunteers who have set out to determine the natural distribution of 100

species of larger basidiomycetes and ascomycetes. The Fungimap species were selected to be readily identifiable in the field. Records are not based on herbarium specimens. Between 1995, when Fungimap was formed, and 2005 more than 20 000 records had been compiled which form the basis of the distribution maps that accompany each description. The photos were contributed by 56 photographers. Apparently many people set out to find all 100 species, a kind of mycological twitchers club. Mycological expertise was not assumed or required of field observers.

This attractive field guide has three main parts: the structure and biology of the larger fungi and checklist of features to observe and record in the field; descriptions of the Fungimap target 100 species; and a glossary, pronunciation guide, colour chart, reference books, bibliography and index.

The one page descriptions include (usually) two colour photographs of fruiting bodies showing all essential macroscopic features for identification, a map of Australia showing the localities where the fungus was recorded and the number of records for that species, and a text description including colour of spore print, odour, habit, substrate, habitat and how to distinguish it from similar fungi. It is all very elegantly done.

There are two possibly controversial matters. Firstly, there is no information on microcharacters such as spore size or ornamentation, no information on cystidia if present and no information on kinds of hyphae or of cuticle structure. Thus the taxonomy is basically pre-Friesian. Secondly, a common name has been given to each species. Where a name did not exist a small group of people took it upon themselves to invent one. The reader will have to decide if that was a sound decision. Most of the invented names are rather twee and not at all memorable.

Overall, this is a valuable addition to the field guide literature for Australian fungi. The authors can justifiably feel well pleased with their efforts.

Jack Simpson